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ABSTRACT

Information analysis centers (IACs) represent a valuable national resource which has not been fully utilized, often because their products and services are not widely known. Recent Government economy measures demand consideration of increased marketability of these products and services and the institution of service charges as a possible source of funding. The development of national guidelines for service charges, which recognize both the basic objectives of IACs and the operating variables which are unique to the individual IAC, is required. Consideration must also be given to existing service charge policies and the advantages and disadvantages of implementing new or alternative policies. Evaluation of the marketability of existing or new products and services requires examination of customer and user markets, the scope and content of these products and services, possible channels for their distribution, advertising and sales promotion, and the prices to be charged. Two case studies, reflecting the experience of two centers which have implemented service charges and the comments of managers on proposed methods of information center cost recovery provide a base on which decisions for service charges can be made. A bibliography of 33 references provides an overview of relevant literature. (AB)

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THE MARKETING OF INFORMATION ANALYSIS CENTER PRODUCTS AND SERVICES

by

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Information analysis centers (IACs) represent a valuable national resource which has not been fully utilized, often because their products and services are not widely known. Recent Government economy measures demand consideration of increased marketability of these products and services and the institution of service charges as a possible source of funding. The development of national guidelines for service charges, which recognize both the basic objectives of IACs and the operating variables which are unique to the individual IAC, is required. Consideration must also be given to existing service charge policies and the advantages and disadvantages of implementing new or alternative policies. Evaluation of the marketability of existing or new products and services requires examination of customer and user markets, the scope and content of these products and services, possible channels for their distribution, advertising and sales promotion, and the prices to be charged.

Two case studies, reflecting the experience of two centers which have implemented service charges and the comments of managers on proposed methods of information center cost recovery provide a base on which decisions for service charges can be made. A bibliography of 33 references provides an overview of relevant literature.

FOREWORD

The problems of marketing information analysis center products and services have become increasingly important in view of tightening budgets and the need to seek new sources of revenue. It was for these reasons that it was felt a report on this subject would provide a basis for managers of information analysis centers to make more meaningful decisions in the area of marketing.

The publication of this report continues the newly established ERIC/CLIS policy of encouraging joint sponsorship with appropriate ASIS Special Interest Groups (SIG). The SIG on Information Analysis Centers (IAC) enthusiastically endorses this trend and, on behalf of my fellow IAC members, I am pleased to endorse this report. By this action, all SIG members are assured a copy. I know of no better way to make such pertinent material available to the most interested audience in a timely manner at minimum cost. Such reports are one of the few tangible benefits of SIG membership and it is hoped that reports like this one will increase interest in such membership. Your comments on this or other proposed reports are welcome.

The SIG/IAC is indebted to Mr. J. I. Smith, Associate Director, ERIC/CLIS, who first called our attention to the need for a report in this vital area and to Alice Billingsley for her editorial assistance.

Robert M. Landau, President
INTERNATIONAL DEVELOPMENT CENTER
Chairman, SIG/IAC
American Society for Information Science

PREFACE

This report was prepared by Walter H. Veazie, Jr., Hughes Aircraft Company, and Thomas F. Connolly, Oak Ridge National Laboratory, for the ERIC Clearinghouse on Library and Information Centers (ERIC/CLIS) as one of its information analysis publications created in direct response to the needs of its user communities. The Special Interest Group on Information Analysis Centers of the American Society for Information Science cooperated with ERIC/CLIS in the publication of the report.

The main body of the report and Appendix A were authored by Mr. Veazie; Mr. Connolly authored Appendix B.

ERIC/CLIS and W. H. Veazie would like to acknowledge the review of the body of this report and Appendix A by E.F. Smith, A.S. Dlott, and M.S. Neuberger, Hughes Aircraft Company; H.D. Moran and Miss Barbara Frautschi, Battelle Memorial Institute; Barry R. Emrich, Air Force Materials Laboratory; Mrs. Elsa S. Freeman, Department of Housing and Urban Development; Mrs. Lois F. Lunin, Johns Hopkins Medical Institutions; E.T. Richards, U.S. Naval Fleet Missile Systems; Dr. Robert S. Shane, National Academy of Sciences; Harry E. Pebly, Jr., Plastics Technical Evaluation Center, Picatinny Arsenal; Walter Christensen, Office of the Director of Defense Research & Engineering (ODD R&E); Dr. Joseph F. Caponio, National Agricultural Library; Robert M. Landau, International Development Center; and Otis Jenkins, Liquid Metals Information Center, North American Rockwell Corp.

The case study reported in Appendix A was generated from information developed by the Electronic Properties Information Center which is currently operated under U.S. Air Force Contract F33615-70-C-1348, with Mr. B.R. Emrich (LAM) Air Force Materials Laboratory, Wright-Patterson Air Force Base, Ohio, serving as Project Engineer. The body of the report and Appendix A have been reviewed by the Air Force and approved for public release.

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INTRODUCTION

Information analysis centers are becoming recognized as national resources. Their capabilities are not, however, fully utilized. Service charges have been recommended by some Government agencies and committees as a means of making the products and services of information analysis centers more widely available to private industry and foreign organizations. Further, current Government funding limitations for the support of these centers has required more careful consideration of service charges as possible source of funds. This report has therefore been compiled to serve as a basic reference tool on the marketing of information analysis center products and services for:

1. Government agencies, societies and other organizations sponsoring information analysis centers,
2. Managers of information analysis centers,
3. Organizations operating information analysis centers,
4. Concerned managers, scientists, engineers and educators who use information analysis centers, and
5. Commercial publishing, marketing and management firms interested in information analysis center products and services as a product line.

It is *not* the purpose of this report to encourage or discourage the concept of service charges, but rather to present the factors which will enable information analysis center sponsors and managers to determine what products and services should be considered as saleable and what could be charged for them.

At the outset, it must be recognized that a national policy for service charges by science and technology information analysis centers does *not* exist. Some Government agencies which sponsor information centers have developed their own criteria for what they consider to be acceptable service charges. Hence, each information analysis center has developed its own service charge system, independently. For some centers, the recovery of printing and distribution costs is considered as accomplishing the objectives of a service charge system. For others, the recovery of royalties from the commercial or Government sale of publications, and the return of royalties or fees to supplement government funding is viewed as fulfilling the service charge objectives. For still other centers, the sale of publications, literature searches, and answers to inquiries, is required to satisfy the service charge objectives of the sponsoring agency. With such diversity in service charges, it is the author's opinion that a national policy or set of guidelines is necessary. When such guidelines, which set forth the criteria for establishing, implementing, and recovering service charges are developed, it may be possible to operate significant cost-recovery systems. A national policy on service charges must not only serve as a guide but must also recognize the variations which are necessary for the successful operation of each center. This topic is covered in greater detail in the section of this report on service charge considerations.

This report will present the basic philosophy of the information analysis center, information center variables, service charge considerations, and guidelines for marketing information center products and services. Two case studies of efforts to secure service charges and a survey of government-sponsored information center managers' evaluation of service charges and marketing are appended to this report.

INFORMATION ANALYSIS CENTER PHILOSOPHY

Before discussion of the primary purpose of this report which is to provide possible guidelines for the marketing of information center products and services, it is first necessary to review the basic philosophy of the information analysis center. Information analysis centers (IACs) existed long before their functions were rigorously defined or they were recognized as a distinct type of information service.

A formal definition for the IAC was developed by Simpson in 1962 (1,2) which is similar to, and an extension of, the concept presented in the Weinberg report (3) and accepted with modification by the Department of Defense (DoD) (4). The Committee on Scientific and Technical Information (COSATI), Panel 6 – Information Analysis Centers, used the following definition in compiling its directory of 119 Federally supported centers (5):

"An information analysis center is a formally structured organizational unit specifically (but not necessarily exclusively) established for the purpose of acquiring, selecting, storing, retrieving,

evaluating, analyzing and synthesizing a body of information and/or data in a clearly defined specialized field or pertaining to a specific mission with the intent of compiling, digesting, repackaging, or otherwise organizing and presenting pertinent information and/or data in a form most authoritative, timely and useful to a society of peers and management."

These definitions emphasize the requirement that IACs be operated in organizations with proven scientific, technological and management expertise. Unfortunately, the operating organizations are not, for the most part, oriented toward commercial marketing of these types of products and services.

Moran* has suggested that there is substantial diversity in the objectives of the various IAC programs. He suggests that there are at least four different objectives:

1. Introspective – intended to further internal goals, e.g., company libraries and data centers, the DoD information centers (which were originally intended only to further the defense effort), etc.,
2. Extroversive – intended to further the general progress of science and technology, e.g., Science Information Exchange, National Standard Reference Data System, Educational Resources Information Centers, etc.,
3. Commercially motivated – designed strictly to produce a profit, e.g., publisher-established and operated centers, journal abstract services, etc., and
4. Advertising and market expansion for industrial sectors, e.g., Copper Development Center, Cobalt Information Center, etc.

With these different purposes in mind, the IAC sponsor and manager must carefully apply the marketing guidelines given in this report.

In considering the marketing of IAC products and services, the advantages to be gained by utilizing an IAC, no matter which organization is sponsoring or operating the center, which of the four objectives are to be accomplished, or whether the center is discipline- or mission-oriented, should be kept in mind. These advantages are:

1. More efficient use of previously generated information thus providing insurance against duplication of effort,
2. Reduction in time and costs needed to secure desired information,
3. Relieving scientists, engineers, managers, educators, technicians and librarians from the problems of literature searching,
4. The provision of authoritative, timely and appropriately packaged condensations and evaluated information and/or data, and
5. The services of responsive specialists who can assist users.

An important aspect of marketing which is largely neglected in the IAC programs is the necessity for promotion of the use of the centers by their sponsors. The government should provide greater encouragement to its own agencies and contractors to use the IAC services for which it pays. The development of service charge systems must be based on the continued ability to secure those advantages of IACs listed above, but persons concerned with developing service charge systems must also:

". . . . increase their efforts to overcome the 'line of least resistance' behavior patterns of users faced with new and improved services." (6)

IAC sponsors and operators cannot evade the consideration of service charges for *all* products and services in view of *present* Government directives and budget limitations.

Information Analysis Center Variables

Each IAC has a unique set of variables which have effected its method of operation, its relationship to its user audience, and, in some cases, its development of service charges. Some of these variables include:

1. Sponsorship
2. Operating organization
3. Personnel
4. Subject or mission specialty
5. User audience

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*H.D. Moran, Director, Defense Metals and Defense Ceramics Information Centers, Battelle Memorial Institute, Columbus, Ohio.

6. Funding level
7. Volume of documents in the center system and rate at which new information is added
8. Equipment
9. Relationship with trade and professional societies
10. Contractual requirements
11. Geographic location
12. Previous IAC experience

The use of Department of Defense sponsored centers has been restricted by the limitations of the user audience which can be serviced:

> "The services of these centers covering scientific and technical information on aerospace materials, are available to Government agencies, Government contractors, subcontractors, suppliers* and others such as research institutes and universities in a position to aid the defense effort." (7)

The reasons for such restrictions include: the basic justification for the IAC which is to assist engineers and scientists in their development of defense materials, limited funds for providing service, requirements for limited dissemination of Government Classified information, exchange of contractor unpublished data for center products and services (*quid pro quo*), progress reports of a preliminary nature, and operating organization policies which prohibit the sale of products or services.

In regard to other agencies, the services of centers sponsored by the Atomic Energy Commission; Department of Commerce, National Bureau of Standards; National Science Foundation; U.S. Office of Education; and U.S. Public Health Service are, for the most part, available to all interested parties in the U.S. or foreign countries, within the limitations of funding. The National Aeronautics and Space Agency (NASA) sponsors several information analysis centers such as the National Science Data Center and the Radiation Effects Information Center. The services of these centers are provided on a reimbursable basis or, in many cases, service charges may be waived, where required, for Federal, State, or local government projects. NASA has arranged for the transfer of scientific and technical information to private industry and foreign organizations through its regional application centers. These centers, which charge for their services, are *not*, however, information analysis centers.

The organizations which operate the IACs are not, as previously mentioned, commercially oriented, and many IAC managers are concerned that service charges will reduce the use of their centers. Informal surveys by several centers of the possible effect of service charges on center utilization reinforce this concern, particularly where aerospace and university users are involved, and the implementation of service charges has, therefore, been avoided whenever possible. In many cases, IAC managers and sponsors recognize that the scientific, technical, and academic communities have not yet reached the point at which that paying for information services is a common practice, but little actual experience is available on the effect of service charges for information analysis center output. Users will require considerable education on the need for service charges if these charges are to be legitimatized. The COSATI-sponsored "Forum of Federally Supported Information Analysis Centers", held May 17-19, 1971, at the National Bureau of Standards, Gaithersburg, Maryland, considered this topic in a marketing session.

At a meeting of the National Security Industrial Association which was concerned with "Barriers to Flow of Technical and Scientific Information", Walter C. Christensen (8) in commenting on the theme of the program indicated:

> "While implied in the Program purpose, I would like to stress that the paramount goal of any technical information activity is to get the right information, to the right person at the right time. Accordingly, we are not so much concerned about the 'flow' of technical information as we are in the availability of quality information, when it is needed. I emphasize this point because too often individuals and technical information activities become pre-occupied with the sheer volume of information without proper consideration for the real user need or quality of the information."

The IACs are particularly concerned about providing the users with the quantity and quality of the information and data needed. Frequently, however, information which is available at a price may not be readily obtained because of a lack of acceptance on the part of users of paying for information services of the technical or scientific inquiry type.

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*It should be noted that the Defense Metals and Defense Ceramics Information Center contracts do not include "others such as . . ." which further limits the user audience.

SERVICE CHARGE CONSIDERATIONS

As previously noted, some government agencies which sponsor IACs have developed their own service charge policies. For one, the Department of Defense, which did not advocate service charges during the formative years of its IAC development and operation, has, since 1968, been encouraging its centers to charge for products and services. The reasoning was that such charges would permit:

1. Utilization of selected DoD sponsored IACs by private and foreign organizations,*
2. Reduced direct government funding to support the IACs,
3. Expansion of the activities of the IACs to provide additional user products and services,
4. Identification of the costs and demonstration of the benefits, to Congress and management, of providing scientific and technical information and data, and
5. An increase in IAC responsiveness to major user needs.

DoD centers have been directed to recover fifty percent of their operating budgets through service charges, by Fiscal Year 1973. A contributing factor to the issuance of this directive is Section 203 of Public Law 91-121, the military procurement authorization for 1970, which specifies that:

> "None of the funds authorized to be appropriated by this act may be used to carry out any research project or study unless such project or study has a direct and apparent relationship to a specific military function or operation."

DoD has provided a liberal interpretation of service charges in that funds recovered from the sale of publications, technical inquiry answering services, and bibliographies, or transferred to the IAC from other government agencies, can contribute to the fifty percent-amount.

When the U.S. Office of Education (U.S.O.E.) established the Educational Resources Information Center (ERIC), it benefited from the difficulties experienced by other government agencies (9) and decided against free distribution of documents acquired by the clearinghouses within the ERIC system. It was reasoned that since Federal dollars were scarce, these dollars should be expended for operations not yet economically feasible within the private sector. The documents processed by the ERIC Clearinghouses are made available to user audiences through a centralized contracting facility funded by U.S.O.E. Thus, the costs of production, marketing, and distribution of these documents do not fall upon the individual clearinghouses nor do revenues from the sale of these documents accrue to them.

With the present level of funding of the ERIC clearinghouses by U.S.O.E. remaining static, it has become necessary for clearinghouses to consider marketing other products and services. The clearinghouses have, in addition to processing documents, expanded their activities to include the production of information analysis publications in their particular subject specialties. These publications include critical review articles, bibliographies and the like for which, again, the clearinghouses receive no direct revenue from their sale. Instead, efforts are made to seek subsidy from the organization holding the contractual responsibility for the clearinghouse operation, or to form cooperative arrangements with related professional societies or with journals in the subject area which publish the information analysis product. These special publications may also be entered into the ERIC system and be made available through the centralized contracting facility.

The Atomic Energy Commission has permitted its centers to sell publications and secure royalties to supplement government funding. The National Bureau of Standards, Office of Standard Reference Data, is evaluating proposals from commercial publishers to handle the National Standard Reference Data System (NSDRS) output. By production of a hard and soft cover report series through a commercial publisher, the NSRDS program managers hope to reduce their disseination expenditure by five percent.

Symposium discussions were held on IAC service charges at the 1969 annual meeting of the American Society for Information Science in San Francisco, during which, according to Mrs. Lois Lunin,* the essence of the discussion was that there were many philosophies to consider in the decision of whether or not to charge for services and products. Perhaps the strongest position against charging was held by the U.S. Public

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*Unless precluded by National defense limitations.

*Program Director, Information Center for Hearing, Speech, & Disorders of Human Communication, The Johns Hopkins Medical Institutions, Baltimore, Maryland.

Health Service which felt that charging might impede the transfer of health information. More specifically, many users of biomedical IACs are doing research at the graduate level or are residents or interns in hospitals, and are unable to pay for such services, but need them in their research activities and in the care of patients.

Objectives of service charge systems which appear to be under evaluation by various government agencies include:

1. Recover the cost of printing and distribution;
2. Reduce the direct cost to the government of IAC operation, supplement government funding to permit the development of additional user products, create self-supporting IACs, and produce a profit or secure revenue;
3. Demonstrate to management and to Congress the benefits derived from, and the cost of, IAC products and services;
4. Permit private industry and foreign organizations to use the IACs, which are now limited in whom they may service, by having the user pay for center output, and
5. Eliminate non-complying or non-revenue producing IACs.

With regard to the specific objectives of producing a profit and eliminating non-complying or non-revenue producing centers, many IAC operators do not conceive the production of profits as one of their objectives. Further, many non-complying or non-revenue producing IACs are, nevertheless, doing a particular job very effectively. For instance, the Remote Area Conflict Information Center (Battelle Memorial Institute) has been noted as a non-revenue producing center which is effectively supporting U.S. overseas research activities. The development of a national policy which provides guidelines on the objectives mentioned above, will enable the sponsoring agency, IAC manager, users and interested parties to act accordingly. In developing the objectives and policies for IAC service charges, it is necessary to consider the advantages and disadvantages of such charges to the government, IAC, user, and publisher, and the IAC as a national resource. For convenience, the advantages and disadvantages of service charges are divided into (a) publications and (b) answers to inquiry services, as shown in Figure I. The various items are not listed in order of importance.

Figure I. ADVANTAGES AND DISADVANTAGES OF SERVICE CHARGES FOR INFORMATION ANALYSIS CENTER PRODUCTS AND SERVICES

PUBLICATIONS

ADVANTAGES

Reduced direct charge to the sponsoring agency for publication

Revenue returned to supplement or eliminate government funding

Broader distribution of publications to private industry and foreign organizations who would be willing to pay for such products

Broader announcement of publications with anticipated increased utilization

Reduce the IAC's time required to handle requests for publications

Require better selection of report topics which would be of wider interest

Justify the elimination of IACs which are not productive in terms of revenue secured

Eliminate "free loaders"

DISADVANTAGES

Increased indirect cost to the government by paper processing costs and fees – cost shifted from one pocket to another

Prevent some possible users from getting the products

Time lag for publication by government or commercial printers

Time lag caused by the procurement cycle

Elimination of limited government research data from inclusion in publicly available reports

Reduce input of information from exchange contributors

A tendency to emphasize the publication of reports with a broad user audience at the expense of special reports with a limited audience, but which are important in accomplishing the center's mission

Increased time for book or handbook generation vs. reports due to permanent comprehensive nature of books and associated graphics

INQUIRY ANSWERING SERVICES

ADVANTAGES

Increased use by private and foreign organizations

Reasonable rationale to handle proprietary interests of users

Require the IAC to be more responsive – provide a better product

Determine if the service can be self-supporting

Reduced direct cost to the sponsoring government agency

Require greater IAC cost effectiveness

Demonstrate to Congress and management of user organizations the costs and benefits of this type of service

Necessitate mass marketing which should increase the number of users

Require government action to encourage the use of IACs in program planning, procurement, and program reviews to assure that current state-of-the-art science and technology are used (Such action is necessary if the IACs are to remain in operation)

DISADVANTAGES

Reduced use of the service by financially hard-pressed government agencies and contractors

Reduction of user – IAC specialist relationship

Time lag resulting from purchase request requirements

Billing problems associated with the service

Possible shift of use to private industry and foreign organizations

Loss of exchange arrangements – reduced processing of state-of-the-art information

Increased cost to the government as a result of double overhead – fee payment by center and user organizations

Profit or fee to a commercial interface organization or government service

Develop possible competition between IACs for limited user service dollars and potential competition between the IAC and commercial organizations in covering the same subject areas

The problem with listing advantages and disadvantages is that a clear cut distinction cannot always be made. The author agrees with the opinion of others that some of the advocates of service charges base their view on those principles of free enterprise which maintain that products and services should stand or fail depending upon whether users are able and willing to pay for them. Those who oppose service charges believe that the greatest gain for society will accrue when scientific, technical, and management information is widely distributed and readily available. In between these two views are those of a number of organizations and individuals who believe that service charges can be secured for some IAC outputs. The significance of the amount recovered from service charges must be determined from experience.

An example of opposing viewpoints on service charges can be shown, for instance, with regard to one of the factors shown in Figure I: "Reduce direct cost to the sponsoring agency for publications." An IAC which prints and distributes its reports at no cost to the user normally accounts for such charges directly to its government contract. Such costs vary widely, depending on the number of pages, binding and paper, number of copies, and mailing rates. By shifting the cost to the user, the advocates of service charges point out that the budget of their agency may be reduced or utilized to provide basic information collections in other areas. It is pointed out that such reports will receive wider distribution if sold and, further, the number of "free loaders" or collectors of reports will be reduced. Therefore, better utilization of the sponsoring agency budget will be achieved by the implementation of service charges.

The opponents of service charges agree that the *direct* cost to the sponsoring agency is reduced, but that the *indirect* cost to the government is increased. When the user is a government agency, contractor or supplier, it is reasoned that the government is still paying for the publication except that the cost is shifted from one agency to another. By charging, the cost of a publication is increased as a result of billing processes and the time required to secure approvals for purchasing documents. An example of the added costs to the government may be illustrated more dramatically by the following: 500 copies of a 100 page report were printed and distributed, at a cost of approximately $600 to the sponsoring agency, under a no-service-charge contractual agreement. The same 100 page report, printed and distributed by a commercial publisher, would cost about $10.00 per copy. If 500 copies of the report were sold at $10.00 per copy, the cost would be $5,000. If *all* of the 500 users of the publication were government agencies, contractors, or suppliers, the increased cost to the government would be $4,400 which raises a question as to savings to the government as a result of service charges.

The cost of developing service charge systems and marketing IAC products and services is currently not allowable as either direct or indirect charges to center contracts. Future contracts will have to earmark some portion of the IAC's budget for such costs, if successful systems are to be developed. An alternative is for the sponsoring agency to assume the responsibility for IAC marketing programs.

MARKETING INFORMATION ANALYSIS CENTER PRODUCTS AND SERVICES

In developing guidelines for marketing IAC products and services, the following basic business marketing variables (10) should be considered:

1. Customer or user market

   Developing better knowledge of current users and consideration of a broader user audience.

2. Product or service selection

   Developing the "right" product or service for a specific user group.

3. Channels of distribution or dissemination

   Developing the optimum system for getting the "right" product to the intended user.

4. Advertising and sales promotion

   Methods which communicate to the users the availability of the IAC product and service.

5. Pricing

   Determination of the "right" price which will make the product or service attractive to users as well as profitable to the IAC.

The *user* or *customer* is the focal point of *all* marketing efforts. Unfortunately, the IAC manager is not able to control many outside conditions which will affect his marketing program. Factors which are not under of the control of the manager are:

1. User environment,
2. Political and legal constraints,
3. Economic environment, and
4. Resources and objectives of the IAC.

The marketing plans made by the IAC manager must be within the limits of the sponsoring organization and the operating organizations' objectives and policies. Figure II provides a listing of basic and specific factors which influence the marketability of IAC output.

Figure II. FACTORS INFLUENCING THE MARKETING OF INFORMATION ANALYSIS CENTER PRODUCTS AND SERVICES

BASIC FACTORS

- National Information Analysis Center Objectives
- National Information Analysis Center Policy on Service Charges
- Funding Levels for Information Analysis Centers

SPECIFIC FACTORS

- Users
  - Size of user audience
  - Location of user audience
  - User characteristics
    - User needs
    - Communication practices
    - Urgency of information requirements
    - Ability to pay for information
    - Willingness to pay for information
    - Traditional information purchasing practices
    - Necessity for direct user-to-IAC contact
- Products and Services
  - Publications
    - Volume or number of copies distributed
    - Number of pages per publication
    - Urgency for dissemination
    - Rate at which material becomes outdated
    - Use of restricted or limited access documents as input to publications
    - Use of publications in exchange for user information
    - Profit that may be recovered
    - Packaging
  - Inquiry services
    - Number of inquiries answered
    - User willingness and ability to pay
    - Cost of providing service
    - Urgency of response needed
    - *Quid pro quo* arrangements
    - Interface marketing and accounting organization interest
  - Distribution or Dissemination Channels
    - User acceptance
    - Availability of Government printing and distribution facilities
    - Commercial publisher or interface organization interest
    - Nature of the market and users
    - Nature of the IAC publications and services
    - Sales effort required
    - Special situations
      - Organization policies or restrictions
      - Contractual requirements
  - Advertising and Sales Promotion
    - Funds to accomplish this marketing activity
    - Method used to maintain an awareness of users of the IAC
      - Personal contact
      - Mass contact
      - Special promotional activities
    - Stage of IAC development
- Price
  - Uniqueness of IAC product or service
  - Demand for the IAC product and service at a "price"
  - Price determination from cost of providing the product or service

Customer or User Market

The size, location, and characteristics of an IAC's user audience must be considered in developing a successful marketing program. Each IAC, as part of an informal information network, has been developed to satisfy the needs of a government mission, and to provide disciplinary, or interdisciplinary information or data services. IAC managers must therefore carefully evaluate the consequences of an expansion of products or the addition of new user groups.

Size – The number of organizations and individuals served by IACs has frequently been limited by contractual requirements, funding, size of the user audience, security classification, specific center output, and, in some cases, lack of aggressiveness on the part of the center. In marketing IAC products and services, every avenue of approach which may increase the number of users must be evaluated. Care must be taken not to reduce the quality of either the IAC input or the output by increasing the size of the user audience. The number of users, however, may not necessarily indicate the importance of the specific user group or interests, or the ability to pay for services. Thus, an IAC sponsor or manager must know how many individuals and organizations are currently being served, and the number of potential users, and make an estimate of the number of users which may be anticipated should service charges be applied to a specific center output. If a large number of users are anticipated, then the sale of the product or service may generate a worthwhile return of funds. If, however, a small audience is anticipated, then the sale of a specific publication or service will result in an insignificant return of revenue.

Location – Knowledge of the geographic location of a center's users is of value in determining promotional activities. If a number of foreign users are identified, the center should consider translation of some of its products. Foreign sales representatives for several centers could be helpful.

Areas with dense user audiences may be best handled through conferences of interested individuals with center representatives. The Government Interservice Data Exchange Program (G-IDEP) Area Indoctrination Clinics have been of such a value in reaching concentrated groups of users. Through practical working knowledge of G-IDEP's operation, users can better determine how to utilize the various capabilities of the system.

This information is also of value in matching the geographic distribution of center users with the distribution of government agencies, industry, and educational institutions concerned with the center's mission or discipline scope to determine the success in reaching all potential users.

User Characteristics – It is equally important to know the characteristics of users in marketing IAC products as it is in designing and developing an information center. (11) User need studies which have guided the establishment some centers provide some clues to expressed interests and needs. (12) Informal surveys indicate that, while IAC users are willing to pay for some products and services, they do not currently have an accounting system or funds available to pay for IAC output. This is particularly true in the case of government agencies, contractors and universities which have been provided information at no direct cost to their programs.

IAC managers, in evaluating expansion of the number of user groups, for their centers must bear in mind that each new user group will have different characteristics, and internal problems for the IAC in retraining or securing technical specialists in the new areas must be anticipated. As an example of the variation in user groups, a study by Garvey (13) of communication in the physical and social sciences found differences in dissemination and assimilation practices. Lags in the process of information flow, the organization and effectiveness of informal networks, and the transfer of information from the informal to the formal domain, were evaluated. Experience and data reported by Cairns and Compton (14) indicate that scientists, educators or academically-oriented researchers are frequently satisfied with bibliographies and abstracts provided in response to an inquiry. But, engineers and managers most frequently want a direct specific answer to a question, in terms and in a format which are intelligible to them, and adapted to the context in which they must use it. The academic training of the various user groups has a marked effect on the utilization of scientific and technical information. Chemists, for example, are instructed in the use of *Chemical Abstracts*, early and regularly throughout their training. Engineers and managers, on the other hand, receive little exposure to the information collection and evaluation problem and how to resolve it. (15)

The information procurement policies and practices of the users' organization determine the extent to which publications and information services produced by outside organizations such as IACs may be used. If the user can readily purchase books, reports and literature search services which he feels are of value to his work, the IAC service charges present little problem. Current management cost control practices, however, frequently require approval for the purchase of even nominally priced items. This is particularly true in the aerospace and defense oriented industries. Users, unfortunately for the most part, follow the line of least resistance in purchasing materials.

With the user paying for IAC services, some centers will find that unpublished information previously provided for center input is no longer available. In such cases, the IAC sponsor will have to determine if an exchange or *quid pro quo* arrangement should be used. For example, the Defense Metals Information Center (DMIC) field representative obtains a considerable amount of unpublished data from the Center users as a result of DMIC providing regular assistance in problem solving. The unpublished inputs provide a valuable source of data to defense programs. It is essential that IAC inputs which have proven to be of value in advancing the state-of-the-art be maintained.

Information analysis centers have dealt directly with their users, and the IAC to user relationships which have thus been developed have been advantageous to both the center and to the user. (16) This direct contact provides for discussion of user problems, expression of format or packaging desired, and indication of the urgency of the need. Service charges for products and services must *not* disrupt this valuable relationship. A well planned and managed program with considerable advance publicity and personal contact will be required if significant revenue is to be obtained while maintaining the current user group.

Products and Services

For convenience to the discussion, IAC products will be divided into publications and inquiry answering services. Under publications, state-of-the-art reports, informal reports, data tables, handbooks, newsbriefs, books, literature guides, contract compilations, indexes, and books, are included. Inquiry answering services are considered to include: provision of scientific, technical, educational or management data and information which is compiled specifically for the inquiry; bibliographies or literature searches which are conducted to answer a request, and special studies which are not published or widely distributed.

In marketing IAC products and services it must be recognized that the user would buy a center product or service not for its own sake, but for the need which is satisfied or expected to be satisfied from its use. Frequently, before users can appreciate an IAC's product or services potential, they must be shown or told how the product or service can fill specific needs. Most IACs have developed publication formats which will best satisfy their users' needs. In seeking expanded markets for IAC output by product variation, considerable care must be taken not to increase output costs. With limited funds, the IAC manager must recognize the trade-off involved in modifying a product from a high-volume, low service charge item to a low-volume, high service charge product.

IAC managers should also consider utilization of the concept of product differentiation. This marketing concept seeks to direct new consumer demand toward existing or slightly modified products. It should be noted that when there are many different consumer demands, even minor product variations may be important and psychological differences may be of concern. Packaging products in various forms should also be considered. For instance, predrilled copies of reports could be provided to users who maintain looseleaf binders for filing publications from the center.

Factors which influence the demand for IAC output include: alternate sources for the information or data, price, urgency, quality of IAC output, awareness of IAC products and services and the level of difficulty involved in obtaining them. If a prospective user's funds are limited, he will probably perform his own literature search rather than pay an IAC to do it for him. The analytical expertise of an IAC may, however, persuade the hesitant prospective user to utilize a center's services.

Each IAC publication must be evaluated on its own marketability, since it must be recognized that volume of sales and importance to the national technology capability have no logical relationship. For example, silicon nitride, which is now being recognized as an important electronic material, is of interest to only a limited number of organizations and individuals. Hence, a survey report, "Silicon Nitride for Microelectronic Applications" (20), while extremely important to the national technology capability, will

probably have a very limited volume of sales. Lengthy bibliographies, directories, or retrieval guides, such as the "Electronic Properties of Materials – A Guide to the Literature" or "Solid State Physics Literature Guides, Volume 1 – Ferroelectric Materials and Ferroelectricity" are best marketed by a commercial publisher because of their size and market risk. (17, 18) State-of-the-art reports, such as, for instance, "the Corrosion of Metals in Marine Environments" with a potentially broad user interest may also be sold. (19) The PLASTEC [Plastic Technical Evaluation Center (DoD)] index to government specifications on plastics and directories has been sold successfully. News briefs or announcement bulletins, such as "NRDS News", may be sold at a nominal fee or distributed at no charge to promote other center products. (21) Other similar publications which are subject to export control or other restrictions, such as the "Ceramic Awareness Bulletin" are provided on a controlled distribution basis. (22) Nominal subscription service charges for these publications could be recovered.

The limited amount of experience with marketing technical inquiry answering services raises many doubts as to its practicality. Based on the time and cost savings which have been reported by users of these services from a number of different IACs, it would seem that the sale of such a service should be very profitable. But, the lack of commercial marketing experience, confusion in government directives, and adherence to the basic IAC philosophy of better information flow have resulted in extremely slow implementation of service charges for the technical inquiry answering service. (23)

Channels of Distribution or Dissemination

An engineer, scientist, educator, or manager can use an IAC publication, or information and data given in response to an inquiry, only if he has possession of the report or answer. The user needs to possess the product or answer at the "right" time and he cannot do this unless it is in a place convenient to him. One function of marketing is to match the segments of supply to the segments of demand, that is, to provide the product which possesses form utility with time and place utility.

The channels for disseminating IAC outputs must be evaluated in greater detail when service charges are to be recovered. Distribution channels which have been used include:

1. IAC directly to user,
2. IAC to Government printing and dissemination agency to user, and
3. IAC to commercial publisher for printing and dissemination to user.

The utilization of an interface contractor or NTIS to handle the technical inquiry services of Air Force-sponsored IACs has been considered. This channel appears necessary for some IACs, due to organizational policies, and to the need for marketing and accounting services. The factors which the IAC manager and sponsor must consider in selecting distribution channels include:

1. Nature of the market and users,
2. Nature of the IAC publications and services,
3. Sales effort required, and
4. Special situations.

Each of these channels has advantages and disadvantages depending on the factor being evaluated. For example, the least time lag is experienced by the user when an IAC disseminates its reports directly to its users. But under the current practices of most IACs, relatively few users receive the reports through this channel. If significant service charges are to be recovered, each product and service must be considered separately and matched with possible distribution channels. A marketing or sales specialist is extremely desirable if the direct IAC to user channel is selected for recovering service charges.

One of the main findings in studies of the effectiveness of IACs, is that the IACs are not used as often as they should be and there is a general lack of awareness of their existence. Because most centers are not commercially oriented, it appears that a commercial publisher, suitable government agency (NTIS), or interface contractor channel of dissemination, may be necessary to provide the optimum marketing effort. (6, 24)

Advertising and Sales Promotion

Advertising and sales promotion are concerned with informing, reminding, or persuading IAC users and potential users about the desirability of IAC products and services. (1) The promotional variable is

becoming quite complex for the IAC. This was not always so. Most IACs, especially when beginning operation, handled the whole marketing job themselves – including the promotional aspect. The IAC relied on personal contact, presentations at scientific, technical or academic conferences, technical and information articles and news releases, and referral by government agencies, for informing potential users of their products and services.

As the IACs have continued their operations, they have found it mandatory to periodically remind their users of the centers' capabilities. This has been accomplished by publication announcements, current development briefs, current awareness services, accession lists, and participation in professional, technical and management associations and societies.

Persuasion as a promotional objective will become increasingly important, and an added expense, with the implementation of service charges. Users will have to be persuaded that the cost of an IAC publication or service, such as an answer to a technical inquiry or bibliography, is worth the effort required to secure management approval for the purchase. A joint IAC sponsor and center effort is required to educate users and mangers on the cost of securing information and the values to be obtained. The basic methods which are used in promoting the utilization and purchase of IAC output are:

1. Personal contact – visits to user organizations and active participation in professional, technical and management organizations.
2. Mass contact – articles, news briefs, announcements of publications, and presentations at conferences.
3. Sales promotion – enhances the effectiveness of personal and mass contact and is aimed at special user groups.
4. Product variations – modification of IAC products and services to fill changing user needs.
5. Price variations – products priced to fit various user groups.

IACs have been in the introductory stage of the marketing life cycle. As such, products and services are "unsought." In this stage, the IACs and their sponsors have pioneered in gaining acceptance of state-of-the-art reports, data sheets, bibliographic and technical inquiry answering services. The provision of publications and services at no charge by many centers has helped in this introductory promotional stage. The user acceptance of PLASTEC reports has, for example, led to their purchase in the cash market.

It appears that the IACs may now be entering into a market growth phase in which emphasis will be placed on the demonstration of the value of products and services to the user. This phase will not follow the normal product life cycle because of the high risk and apparent low profitability of IAC products and services. Therefore, during this period, it will be necessary for the IACs to maintain a marketing mix consisting of publications which are sold, given away automatically, provided on request, and distributed to authorized users only. Articles which remind IAC users, and inform others, of IAC products and services must be generated regularly. (25) Such articles must be placed in journals that are read by that user audience which the center is trying to reach and serve.

An IAC's mailing list has always been important. Such lists will take on an even greater importance in developing an advertising and aggressive marketing effort to recover service charges. Mailing lists for U.S. and foreign scientists and engineers may be developed by purchase from commercial organizations, such as McGraw-Hill, or from professional societies, such as the American Chemical Society, Chemical Abstracts Services. The IACs can also provide copies of their publications to appropriate professional and trade periodicals for review. This is an excellent method of advertising new reports.

Price of Products and Services

The uniqueness of an IAC's product or service, technical or scientific competence, creative promotion, or simple availability at the essential time, may be more important than price in many cases, but price remains a critical variable in the marketing of IACs. The provision of IAC output at a price to the user imposes a major change in IAC philosophy. The primary objective of the IACs, to disseminate advanced scientific and technical information as rapidly and widely as possible, may have to be modified to some as yet unknown degree to permit the marketing of the output of some centers. The tight budget for the operation of some centers will require that additional funds be secured through the sale of products and services or by transfer of funds from other government agencies, if the centers are to remain in operation as national resources.

The legal aspects of services charges must be resolved as an integral part of the national policy on service charges. In the case of the U.S. Air Force, Judge Advocate rulings which have prevented the collection of service charges (26, 27) have been resolved by contract revisions. The inclusion of IAC publications as contract deliverables restricts the center from granting or securing copyright privileges. This problem has also been resolved for the Air Force but not without considerable delay in the publication of center products.

Most IACs have had little experience in determining prices for their publications and services. In a state-of-the-art study by Penner (28), it was reported that a sound basis for determining the costs of information services has not been developed. The costs of information and data storage and retrieval systems input, (29) report generation, answers to technical inquiries, printing, distribution, and management, are known in many cases, but the problem of allocating these costs to a product or service sale price has been accomplished in only a limited number of cases. Papers by Marron (30), Wilson (31) and Lancaster (32) are helpful in the evaluation of information system costs and, hence, in determining the price of IAC output.

The pricing of IAC products and services will definitely depend on a national policy for service charges, as discussed on papges 4 and 5, as will the channels for disseminating information and data. If an IAC is going to sell its products and services directly to its users, the center is assuming all the risks of printing and distribution expenses. If a large volume of publications are sold and a large number of inquiries answered, this direct channel appears to offer the greatest profit potential. The IAC operated in a small company, or by an organization, which can economically handle a combination of small and large sales transactions, may well select this marketing approach. (23)

By utilizing the National Technical Information Service as its sales agent, the Plastics Technical Evaluation Center appears to have developed an extremely promising channel for disseminating its publications. PLASTEC covers the distribution costs of NTIS and recovers an additional amount to supplement its government funding. The industrial fund arrangement which is used to transfer funds from NTIS to PLASTEC may also be used by contractor-operated IACs, This channel appears to offer the user the lowest priced publication while returning the maximum amount to an IAC. The disadvantage may be the low effort of advertising.

The utilization of an outside contractor for reproduction and dissemination services, as is done by the ERIC system of the U.S. Office of Education, offers another alternative. As mentioned earlier, documents acquired by the clearinghouses within the ERIC network are sent to a centralized contractor facility for reproduction and distribution. The contractor charges a nominal fee to users for the hard copy and microfiche versions of the documents.

Another alternative is the utilization of a commercial publisher for printing, distribution and return of royalty to the IAC from the sale of publications. The DMIC, Electric Properties Information Center (EPIC), Thermophysical Properties Research Center (TPRC), and the Research Materials Information Center, (RMIC), for example, have utilized this alternative. While the price charged to the user under this alternative appears to be high, it is recognized that lengthy retrieval guides and data compilations (33) may be high-risk sale items. There is a high initial risk to the publisher until the market is identified. But, once the sales volume has been determined, the risk is greatly reduced, and the IAC should seek to recover better royalties. The use of professional societies or trade associations for marketing state-of-the-art publications is also a possible alternative.

The pricing of inquiry services presents a considerable problem. Charging for the time spent in providing an answer, or for computer costs in generating a bibliography, appears to be straight-forward, however, the time spent or the computer search often yield a negative result. While the centers and the users recognize that a negative result may often be as important as securing the desired answer, management does not consider such intangible information as worth the cost. The limited experience of centers instituting service charges for this type of service indicates a definite drop in utilization. Aggressive marketing of this service is mandatory, if the level of utilization is to be maintained and significant revenues are to be recovered. Proposals for commercial marketing of inquiry services include a profit for the interface contractor. This profit increases the cost to the user, and he may therefore elect to find the information himself. The necessity for such added costs will require careful examination by the IAC

sponsor, manager, and users. By charging for such services, however, the centers may be able to expand their audiences to private and foreign organizations. The extent of this market remains to be determined.

Various methods of payment must be evaluated as part of the pricing activity. Subscriptions, coupons, per-item purchase, hourly charges, membership, etc. are all possible methods. That of a planned subscription method of recovering service charges appears to offer the least inconvenience both to the user and the IAC. Pricing differentials for government agencies, universities, non-profit organizations, government contractors, private industry, foreign organizations and the general public must be evaluated. A combination of payment methods, premium charges for providing urgently needed information, and fee rates complicate the overall pricing schedule. Nevertheless, in order to best assist the IAC user and recover the maximum revenue for the IAC, all pricing variables must be taken into account.

SUMMARY AND CONCLUSIONS

Information analysis centers represent a valuable national resource which has not been fully utilized. Many centers are still in early stages of development in which their products and services are not widely recognized. Unfortunately, Federal support for many centers is being reduced as a result of Government economy measures. As a result, IACs are being directed or encouraged to institute service charges for their output in order to maintain funding levels.

A coherent national information analysis center service charge policy has not been developed to guide sponsoring organizations and the IACs in implementing service charges, and legal and administrative problems have been encountered by centers trying to recover service charges. National guidelines must include recognition that the basic objective of the IAC program is to collect and analyze scientific, technical, management and educational information and data, and to facilitate rapid dissemination of that information in order to prevent duplication of effort, enable faster achievement of goals, and reduce the overall national expense of scientific, technical, and educational progress. Policies which tend to inhibit the inflow or outflow of information through the IAC will necessarily compromise that objective. A national pricing schedule for *all* IAC output could well have such an effect.

In evaluating the marketability of an IAC product or service, the center sponsor and operator must consider the national policy, center users, specific publication or service, channels of distribution, advertising and sales promotion, and pricing. Centers, which do not rely on user inputs and are concerned with information and data which are in the public domain, may realistically consider service charges for their outputs. The ability of users to pay, and their willingness to do so, will determine the significance of any revenue secured. The channel for dissemination will depend on the center's contractual requirements, its users, the interest of commercial publishers or its responsible government agency, and the costs of publication and dissemination. If the direct IAC to user channel for dissemination is selected, the center should consider employing a marketing/sales manager. The relatively low utilization of the services and products of the IACs suggest that mass marketing and education are necessary. While mass marketing might increase the number of publications distributed or sold, the use of scientific and technical inquiry answering services is expected to decrease with the implementation of service charges. The decrease in utilization is anticipated *not* because of reduced user needs, but because of the restricted budgets imposed on most areas of the U.S. economy and the reluctance of users to process the paper work necessary to pay for these services.

During the period of introducing service charges, IACs will have to develop a marketing mix of products and services which can still be provided at no cost to users, while selling other output. Such a mix will serve to keep current users aware of availability of the center's products and services while they are being educated to the fact that publications and services must be paid for.

Each sponsoring agency and center must consider the variables which have guided the development of the IAC. *All* IACs and sponsors will have to work together to educate users and managers on the cost of providing information and the value obtained by using IACs. Sponsoring agencies will have to weigh the nominal rate of return from IAC sales, cost to the user, and benefits possibly accruing to a commercial publisher or interface contractor. The final decision on service charges must be in the national interest.

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APPENDIX A

CASE STUDY

ELECTRONIC PROPERTIES INFORMATION CENTER SERVICE CHARGE EFFORTS

The Electronic Properties Information Center, EPIC, was initiated in 1961 at Hughes Aircraft Company, Culver City, California as the result of a competitive bid by the U.S. Air Force, Air Force Materials Laboratory, Wright-Patterson Air Force Base, Ohio. The Center had, and continues to have, as its objectives:

1. Collecting, indexing, and abstracting all literature containing experimental data on electronic, optical and magnetic properties of materials.
2. Answering technical questions through use of that literature.
3. Compiling bibliographies and making literature searches.
4. Writing commentaries and other special reports.
5. Synthesizing and, in an organized manner, evaluating and compiling data from the liteature.

In 1963, as the computerized storage and retrieval system expanded, the Center staff found increasing user interest in having personal access to all of the Center's references. The Air Force Materials Laboratory also recognized the benefits of disseminating information on the EPIC holdings, but, because of the high cost of printing and the uncertain number of users, felt that such an output was beyond the Center's funding level. The Air Force therefore encouraged EPIC to seek another method of disseminating a guide to Center holdings. A commercial publisher, IFI/Plenum Publishing Corporation, was found who was most interested in handling the commercial dissemination of an index to the EPIC collection. Volume 1 of *Electronic Properties of Materials – A Guide to the Literature* was subsequently published in 1965. Volume 2 of the *Guide* was published in 1967 and Volume 3 in 1971.

At a sales price of $150 per volume, over 1,200 copies of volumes 1 and 2 of the EPIC *Guide* have been sold. This sales record is particularly impressive considering the difficulties which were encountered at the beginning of the sales program. Initially, sales of the first volume were hampered because of concurrent sales at $15 per volume by the Clearinghouse for Federal Scientific and Technical Information.* A significant portion of the royalty recovered from the sale of the *Guide* is returned to the EPIC operation to generate new data products.

Early in 1968, an extensive plan was developed by EPIC to publish major technical products produced by the Center. All EPIC Data Sheets, Survey Reports, selected EPIC Bibliographies, and Volume 3 of the *EPIC Guide* were to be published by Plenum, both individually, and in series form, on a subscription basis. Ten such publications were to form the first volume of this series. This effort was enthusiastically encouraged by the Air Force Materials Laboratory. In July 1968, three years after EPIC had begun a sales program on its own, Dr. John S. Foster, Jr., Director, Defense Research and Engineering, issued a memorandum titled, "Plans for Charges at Information Analysis Centers". Dr. Foster requested a plan from the Department of Defense-sponsored centers detailing how all output costs encountered by the centers would be recovered by an orderly transition to a schedule of charges for the services of the centers. The stated intent of ODDR & E was that, by Fiscal Year 1973, all output costs for the centers would be supported by such charges; input costs to the centers would continue to be supported by the Department of Defense.

With approximately $12,000 to $15,000 in royalties expected from the sale of EPIC technical products and the *Guide*, and with Plenum assuming all reproduction costs, it appeared that the EPIC service charge program more than satisfied ODDR & E's intent for sales to cover the output costs of the EPIC publications program. An additional advantage of this program would have been the increased distribution of EPIC publications to the scientific and technical communities; a Plenum sales estimate of 1,000 to 1,200 copies of each publication represented approximately twice the current distribution of EPIC publications by the Center and the Clearinghouse for Federal Scientific and Technical Information.*

By December 1968, EPIC and Plenum had formulated a publishing agreement, and in accordance with the EPIC-Air Force contract, the Center requested Air Force authorization to implement this publishing

*Now the National Technical Information Service.

agreement and to begin the sales program. Such authorization was denied for reasons not completely understood. Apparently, the Air Force Judge Advocate questioned the legality of the sale of products prepared under Government contract. In any case, during 1969, EPIC found itself with an increasing number of completed publications, all ready for sale, and all rapidly becoming outdated. Finally, in November 1969, with no authorization to sell these publications, the Center distributed them free of charge to its users, with supplementary distribution made by the Defense Documentation Center and the then Clearinghouse for Federal Scientific and Technical Information.

It must be recognized that the major input to EPIC is from the open literature and from unrestricted government research reports. Such information is widely scattered in the liberature and was virtually impossible to identify before EPIC was established. Further, EPIC does not depend on information or data exchange activities for inputs to its system. Thus, the Center has considerable freedom in determining the marketability of its publications.

The current EPIC-Air Force contract has been worded so that the Center may enter into marketing agreements for the sale of its publications. Two contracts have been negotiated with Plenum; one for the publication of Volume 3 of the Retrieval Guide and a second for the publication of *Handbook of Electronic Materials*. It should be noted for Department of Defense contracts, that publications included on the Contract Data Requirements List DD 1423, are Government property and hence can be reproduced by the Government. This prevents the information analysis center from securing or granting copyright privileges. This problem may be resolved by the use of the necessary Armed Services Procurement Regulation (ASPR) clause.

Plenum Publishing Corporation has recently started aggressive marketing of:

Electronic Properties of Materials – A Guide to the Literature Vol. 3, 1971.

Handbook of Electronic Materials, Vol. 1, *Optical Materials Properties*, 1971.

Handbook of Electronic Materials, Vol. 2, *III-V Semiconducting Compounds,* 1971.

Handbook of Electronic Materials, Vol. 3, *Silicon Nitride for Microelectronic Applications – Part I Preparation and Properties*, 1971.

Three additional volumes in the Handbook series are scheduled for completion during the current contract.

A great amount of consideration has been given to the marketing of the EPIC technical answering service. In May 1970, a marketing plan was submitted to the Air Force Materials Laboratory. The center has taken the position, with which the Air Force Materials Laboratory appears to be in agreement, that it is not feasible for Hughes Aircraft Company to market such a service on its own. Although a large aerospace/electronics company provides an excellent scientific and technical environment for the Center, the necessary billing, accounting and sales costs involved in controlling individual sales transactions in a large company would sharply reduce the sales profits.

Of course, the number of individual transactions could be reduced by offering the answering service on a subscription or annual retainer basis to large user organizations. Again, the Center has taken the position that it is not currently feasible for Hughes Aircraft Company to publicize and market such a service. EPIC has therefore, in its May 1970 plan submitted to the Air Force, suggested that the Department of Defense arrange for an experienced, central interface organization to market the service to all interested users. In order for such an arrangement to return a profit to the information center and provide the interface service organization with a profit, it will be necessary for a number of information analysis centers to utilize the service organization. The mechanism for processing user inquiries remains a major problem.

EPIC is currently working toward the development of a "right" marketing mix of formal, broad-interest publications for sale by Plenum, and informal interim reports which are provided to authorized users at no charge on request. The interim report series serves to keep EPIC users reminded of the Center and provides a test of the marketability of various report topics. The quarterly *EPIC Bulletin* is distributed automatically to over 1,200 individuals at no charge to inform them of Center publications and current program developments.

In 1970 the Air Force Materials Laboratory organized an EPIC Advisory Committee to provide guidance on technical and scientific matters as well as marketing, publicity and funding. Task force reports are to provide recommendations to the sponsoring agency on various aspects of the EPIC program including user service charges. Implementation of the Committee recommendations will require sponsor approval. This Committee has already been of great value to EPIC and the Center plans to work closely with various Committee members in improving and expanding the EPIC operation and service charge activity.

APPENDIX B

RECOVERY OF INFORMATION CENTER COSTS

Part 1. The Research Materials Information Center

The expressed interest of the Bureau of the Budget and the assignment by COSATI Panel 6 of a special session during its forum on the Management of Information Analysis Centers to discuss the methods of marketing information center services constitutes a fair warning that those involved in the management of such centers seriously examine the variety of suggested methods of recovering costs, with their possible effects on the operation of *their own particular center* – and that they make their opinions known in time to be considered by whatever body that might eventually decide upon a marketing procedure, if, indeed, such a decision is made.

The source and manner of support, the subject-matter, aims, and methods of the government-supported information centers vary widely, and the impact of any over-all marketing scheme will vary accordingly. Those involved with each center will have to consider the likely effects of the suggested methods upon various aspects of its operation. This first part of this discussion will reflect the opinions of the Research Materials Information Center (RMOC), which is supported by AEC as part of the Research Materials Program, on the recovery of information analysis center costs. A second section will present the results of a questionnaire sent to other government-supported information centers.

In general, the suggested schemes for recovering costs involve one or some combination of the following:

1. direct sale of publications to users,
2. return to Centers of "royalties" for publications sold by NTIS (National Technical Information Service),
3. promotion and sale of publications by a commercial publisher, with royalties to the Center,
4. subscriptions, contracts, or open accounts at the Center by user organizations,
5. direct charge for each inquiry answered (this might or might not involve additional costs for publications included as part of the response),
6. pro-rated funding by several government agencies benefiting from the Center,
7. single-source funding regardless of multiple agency benefits, and
8. use of a commercial marketing agent to handle charges.

No controlled experiment, to my knowledge, has been undertaken to test the effects of any of these schemes on either 1) their ability to provide sufficient funds, or 2) their influence on the operation of a center and the quality of information it provides. This second point should be of particular concern and has probably not been sufficiently considered by those whose major interest is budgetary and who are neither users nor managers of information centers. Although there have been no controlled tests as such, several centers have, by choice or necessity, tried one or more of these schemes either as additions to, or substitutes for, the usual direct support by a single agency. The one exception is that listed last, the use of a marketing agency for inquiry service intermediate between the information center and the user. This has reached the stage of a formal proposal by a commercial publisher which is now being considered by various groups within the Department of Defense. Reactions of the managers of a selected assortment of information centers to these plans or trials will be reported in the final section.

The experience of the RMIC, which has been answering inquiries on the availability, preparation, and properties of ultrapure inorganic solid-state research specimens since 1963, has, and that only recently, included the use of a commercial publisher as an outlet for its bibliographies. One bibliography has been published and three are in press. Since the main reason for this choice was the lack of funds for the usual Oak Ridge National Laboratory (ORNL) publication, the venture is a success so far even if only by the very crude measure that something is better than nothing (assuming, of course, that the publications are of some value). Royalties are part of the arrangement, but they were never expected to contribute much to the support of the center.

The day-by-day operation of the center, however, does provide a background for a reasonable criticism of the other schemes proposed – emphasizing again, only as they would affect the RMIC. In general, the

sale of actual publications (as distinguished from the detailed answer to a specific inquiry) raises no objections. The channel might vary with the publication; the commercial outlet and its promotional advantages being chosen for publications of more general interest, and NTIS for those of limited interest.

Funding by subscription, contract, or open account, raises the question of the dependability of such sources for a center covering so wide and varied a field as does the RMIC. A center as ultra-specialized as the Cobalt Information Center, for example, has been able to count on long-established industrial support both here and abroad, but this is a case of a clearly-recognized single interest. For the wider-ranging center, and in cases where basic, non-applied, research is involved to some degree, direct industrial or even disciplinary advantage is less obvious. The connection is even more tenuous when the user of the center is a university department, a small group within that Department, or an individual graduate student.

The assignment of charges for individual specific inquiries raises more difficult questions. Does a graduate student pay the same as a large corporation? Does one charge on the basis of the time spent, and if so, how is this determined? A request for coverage of a broad field might be quickly answered by an existing bibliography (already paid for by someone else?), while the answer to a unique, if trivial, technical question might involve many hours. Even granting an equitable system could be found, how is the user-center relationship, the informal *exchange* of information, the routine forwarding of preprints, theses, data sheets – even the jotted note about the growth and availability of a new crystal – affected by the imposition of charges? There is an important difference between the attitudes of the "participant" and the "customer."

It would be impossible to handle the bookkeeping within the center without a larger staff, and this points up what is perhaps the major objection, in principle, to any system of inquiry charges. Every step in the mechanism of billing, payment, and accounting *adds to the cost* to the government, of an information center whose work is largely in support of government-financed research (the charges become part of the researcher's expenses, paid by the government). If it is determined that a center is serving its purpose, it is simpler – and cheaper – to fund it directly. It is true that non-government research is indeed a beneficiary of the center's efforts – this particular center is part of a national laboratory, with obvious responsibilities for such cooperation. For the same reason, foreign participation in the services of the center is justified by the exchange of information, largely by informal agreement between the center and major national institutes or university departments, and by the international exchange of research specimens.

The benefits derived are, if not intangible, extremely difficult or impossible to measure quantitatively. At best, a qualitative judgment of the worth of the center could be made by those who have used it over a length of time. If the judgment is favorable, a quantitative decision could possibly be made on the basis of the apportionment of a definite percentage of the research budget to information handling. The "economy" of the simplistically attractive measurement of value in terms of immediate cost recovery involves the hidden cost of additional paper shuffling (it costs money to simply move money from one pocket to another, and small empires have been built on the process) and the more serious cost of damage to the information exchange.

One interesting aspect of the over-all question of support of specialized information centers appeared in a 1970 NSF report.[1] While an estimated $30 million was spent in FY 1970 for the spport of special information centers, the estimated expenditure for research and development in information sciences was $66 million.

Part 2. Survey of Government-Sponsored Information Centers

Figure III shows the questionnaire mailed to about 70 data or information centers chosen from the COSATI directory. The choice of recipients was based on the descriptions in the directory, and no questionnaires were mailed to those centers that did not seem to be faced with the questions at issue, for example, those whose only output was a fairly regular publication or those whose limited (for whatever reason) clientele showed the questions to be inapplicable. Forty responses were received, and two points were immediately obvious: 1) methods 5. and 8. (direct charges for inquiries and use of a commercial on the questionnaire marketing agency) were most strongly opposed, and 2) responses varied widely according

[1] Federal Funds for Research, Development, and other scientific Activities, Fiscal Years 1969 and 1970, NSF-70-38, Vol. 414, p. 76.

to the scope and aims of the individual centers – of which, more below. Table 1 shows the distribution of responses for each method of cost-recovery listed in the questionnaire.

The most strongly favored methods were single-agency or pro-rated agency funding, and sale of publications by NTIS. Single-agency funding was favored over the pro-rated multi-agency funding, with one added suggestion that a single funding agency could accept funds from other benefiting agencies. In this case, the bookkeeping remains a central agency affair and does not devolve upon the information center. Distribution of publications by NTIS, with royalties returned to the center, has been used with satisfaction by at least one center, and is favored in theory by many, but several other comments indicate dissatisfaction with the quality of the published copy.

These reactions, taken simply as the results of an unanalyzed vote, were fairly predictable. Of greater interest are the specific comments concerning each item, and the *sources* of the comments; that is, the nature of the information center giving a particular response. Why should two centers, covering comparable subject areas, flatly disagree on any one of the specific questions asked? In an attempt to answer this, I will take each suggested method separately and reproduce some of the comments, followed by some general comments in response to the questionnaire and my analysis and conclusions on the comments.

Figure III. QUESTIONNAIRE

Marketing of Government-Supported Information Center Services

The methods listed below have been proposed as possible means of information-center cost recovery. Please insert after each the number best reflecting your attitude toward it.

(1) Strongly Favorable
(2) Favorable
(3) Neutral
(4) Opposed
(5) Strongly Opposed

If you favor or have tried or considered a scheme not listed, please evaluate it in the comments section.

1. Direct sale of publications ( )
2. Promotion and sale of publications by a commercial publisher, with royalties to center ( )
3. Sale by National Technical Information Service (formerly the Clearinghouse) with royalties to center ( )
4. Subscriptions, contracts, or open accounts at the center by user organizations ( )
5. Direct charge for each inquiry answered ( )
6. Pro-rated funding by several benefiting government agencies ( )
7. Single-source funding regardless of multiple agency benefits ( )
8. Use of a commercial marketing agency to handle charges ( )

COMMENTS (*use attached sheets*)

(The tabulation above is intended to elicit a weighted sampling of opinions, rather than mere "yes or no" reactions. Comments, however, are essential; and any benefit of your experience with these or other methods, or opinions based on center operation concerning untried methods,will be appreciated. Do not hesitate to add extra pages. Copies of reports of pertinent studies will be most useful.)

NAME _____ Organization _____

Address _____

Table 1

DISTRIBUTION OF RESPONSES TO QUESTIONNAIRE

Method	Strongly Favorable	Favorable	Neutral	Opposed	Strongly Opposed
Direct Publication Sale	6	9	9	8	7
Commercial Publishing	3	9	13	8	6
NTIS Sale	8	15	8	5	1
Subscriptions	6	9	11	7	4
Direct Inquiry Charge	3	6	4	13	13
Pro-rated Agency Funding	9	13	9	5	2
Single Agency Funding	16	10	9	4	1
Commercial Marketing Agency	1	2	8	12	13

COMMENTS ON PROPOSED METHODS OF COST-RECOVERY

1. Direct sale of publications

"The sale of RSIC publications would be more trouble than it would ever be worth. The cost of accounting and bookkeeping within the local bureaucratic setup would be prohibitive. The increase in the clerical needs within a Center would be great. The income, in contrast to costs, would be minimal."

I am opposed to the direct sale on the grounds that too much time and energy would be expended by center personnel in handling advertising, distribution, etc."

"Our handling the subscriptions to our *Bibliography on High Pressure Research* has been effective in keeping us in close touch with those interested in the publication. Our subscribers are few (about 230), however, so it has not been difficult (physically) to handle."

"All our publications have been distributed at no charge. With increased requests from commercial book dealers and sales concerns, we decided in 1970 to recover some of our publishing costs by selling our Reports to commercial requesters. Qualified scientists, their organizations, and libraries, continue to receive our publications at no charge."

2. Promotion and sale of publications by a commercial publisher, with royalties to center.

"As far as publication by a commercial publisher is concerned, we feel that some monographs, handbooks and critical reviews generated by an information analysis center are definitive works having a place in the formal scientific literature and will be most accessible if distributed through regular journals or publishers. On the other hand, much of the service we provide is valuable for only a few weeks or months. One does not have to read many proceedings and symposia to conclude that transiently useful scientific information becomes gold-plated garbage when subjected to the formal publication process.

"The major problem in using commercial publishers and agencies is, of course, size of market. Although our total 'market' is about 4000 persons, the interest of these persons in our subject matter is so fractionated that distribution of 300 copies of one of our documents indicates a 'bestseller.' In general, our distribution figures are comparable to normal distribution of reprints of journal papers, but sales in this range are not commercially attractive. The danger is, then, that marketability in numbers sufficient to provide a satisfactory profit rather than potential scientific value would become the major factor in determining which document or bibliography is prepared. Commercial exploitation of this sort could rapidly destroy the usefulness of an information center to the scientific community."

"However, the products of centers like DMIC and DCIC are topical and state-of-the-art reports and resumes of significant advances in metals technology. Discussions with a number of commercial publishers have led to the conclusion that the commercial market for publications of this nature is extremely limited; accordingly, in order to pay publication costs alone, prices must be set at a level which further restricts the available market – and thereby inhibits the communication of that information. Reviewing the DMIC and DCIC publications of recent years with such publishers, we find that less that 10 percent are individually of interest to the commercial entrepreneur. This would suggest that if publications of the centers are to be sold, the subject matter must be oriented to a commercial market rather than to the needs of technology. In addition, such publications must be of sufficient dimension, i.e., scope and number of pages, to merit commercial publication and attract sales. Both of these points suggest that the primary objective of the centers, to disseminate advanced technical information as rapidly and widely as possible, must be substantially compromised to achieve marketability.

We mentioned above that a typical report costs about $10,000 for professional preparation of the manuscript. Even at the 20 percent royalty rate currently negotiated by DMIC, we can anticipate recovery of not more than 25 percent of those direct costs per report."

"If a commercial publisher is involved, I prefer one of the type of the Joint Committee of Powder Diffraction Standards (the publisher of *Crystal Data*). There are very definite advantages in that the advertising and marketing abilities are proved quantities for any good commercial firm. But in the case of an organization such as the Joint Committee which is essentially non-profit all moneys beyond necessary expenses will be turned back to the project to fund future editions of the book."

3. Sale by National Technical Information Service (formerly the Clearinghouse) with royalties to center

"The objection to using the National Technical Information Service is based on three problems, which might be solved. First, the NTIS has not done an adequate job of informing the academic research community (our major market) of its existence, holdings and services. Second, its ordering system is well-calculated to keep the occasional user from getting a document. Trying to find the order number can be a major research project in itself, especially if the publication is several months old. Furthermore, some purchasing and accounting departments responsible for grant disbursements will not let the researcher buy the necessary scrip. They fear that scrip purchased on grant A will be used to order documents related to grant B, or that the investigator will have scrip left over when the grant expires and that the federal auditors will disallow the expenditure. All-in-all, the situation is so bad that more than one scientist has asked us to secure publications from NTIS and retail them because no one at his parent institution or local book stores could figure out how to buy anything from NTIS. Third, the NTIS price and quality on hard copy are objectionable. We can duplicate and circulate a better copy at a lower cost. Microfiche is simply not the answer because it is not adaptable to all uses of a hard copy. Suppose, for example, that a reader wants to mark a significant passage for future reference, or check the bibliography in the library. How does he do this with microfiche?"

If sales should be handled through the Government Printing Office, there is the disadvantage that the present methods of advertising are poor, and delivery is often slow."

4. Subscriptions, contracts, or open accounts at the center by user organization

"One reason for the strong opposition to direct sales, charges and subscriptions expressed on the questionnaire is that adding a bookkeeper to our staff would add more to our operating cost than we can reasonably expect to recover on services to clients who are not able to pass the cost back to the Government, directly or indirectly."

5. Direct charge for each inquiry answered

"The usual user cannot estimate the value of information since he is apt to not know what can help him. Therefore, he is reluctant to pay for it. Depending on user charges would prevent the development of information centers for the same reason that public and technical libraries must be subsidized."

"A charge on information requests would be fine for correspondents with sufficient funds. I'm sure, however, that such a charge would decrease markedly the accessability of the IAC to many scientists."

"Finally, we would note that in our judgment there is a very modest potential user audience for services of the DoD information centers outside of the defense/aerospace community. Thus, it is apparent that the vast majority of users are and will continue to be involved in government-sponsored programs, in which case charges for inquiry services will, in fact, be paid by the Government."

"The introduction of charges for inquiry services raises similar but perhaps more critical reservations. The first and most apparent is the difficulty for the average inquirer to arrange the necessary authority and purchasing paper work to pay the charges involved. While over 60

percent of the respondents to DMIC's current user survey have indicated a willingness to pay for inquiry services, a majority of those have noted that 'the paper work would be cumbersome and would perhaps prevent our actual use of such services in the future.' We believe strongly that the inquiry service is the most important function of DMIC and perhaps the second most important contribution of DCIC. We believe that response to critical technical questions and problems must not only be thorough and authoritative, but must be immediate. Introduction of the necessary paper work system to provide for payment will not only discourage use of this service, but will considerably delay its availability."

"Another thing which bothers us about such proposals is that the bulk of any fees we would collect would come from federal funds. Instead of reducing the cost of our services to the taxpayer, charging fees would increase their cost to him by the amount spent for the bookkeeping required in the client's organization and ours."

"In the first three months of 1969 we received 25 inquiries. In April we imposed a fee system. Since then we have received one inquiry. Part of the problem here was that we could not guarantee we would locate information of value. The argument that a search showing there were no previous results was worth paying for was not convincing to the man."

"The inquiry services are going to be cut back drastically with the imposition of a rigid fee system. The revenues from small service fees ($100-250) are not worth the trouble to process nor does the the total volume so far contribute significantly to the budget. Charges for search, analysis and report work have brought in significant revenue, but have been limited in number."

"Scientific information analysis centers cannot now and should not in the future be evaluated on a cost per request basis, any more than a major review paper can or should receive a dollar evaluation."

6. Pro-rated funding by several benefiting government agencies
   and
7. Single-source funding regardless of multiple agency benefits

"For the sake of efficiency within the data center, I am very much in favor of single-source funding. However, if an office such as that of the Office of Standard Reference Data were to handle direct funding to a center, then that office could be responsible for supervising pro-rated funding. Such funding then could reflect the benefits received by various agencies."

"If there are several benefitting agencies, 6 is preferable to 7, because the center should have more freedom in this way to serve the total community."

8. Use of a commercial marketing agency to handle charges

"Proposals for 'commercial' sale of inquiry services necessarily include a markup for handling and profit which we suggest would then simply increase the cost of the information to the Government."

"First, we feel that extraordinary attention must be given to the selection of a suitable interface contractor. Should that organization be motivated solely by commercial profit, its attention will, we fear, not be given to the primary objectives of the information programs. Futher, if the organization is not qualified to represent the many disciplines involved, its activities on behalf of any given center may be less than effective, compromising both the mission and the measure of value of that center."

General Comments

"Sale of information services puts information exchange on a basis inimical to the normal free and open exchange normal to the scientific commuhity. Information exchange would stagnate in a commercial atmosphere."

"In our judgment, the fundamental objective of the IAC program is to collect and analyze technical information and facilitate the rapid dissemination of that information in order to prevent duplication of effort, enable faster achievement of technical goals, and reduce the overall national expense in technical progress. Any measure which inhibits the inflow and outflow of information through the IAC's will necessarily compromise that objective. Accordingly, in principle, we believe that charges for these information services are inimical to the mission of the IAC program.

As mentioned below, we are convinced that the practical costs of operation of the information centers – provided they continue to pursue their current objectives – cannot be retrieved to any significant degree through charges for services. We also are convinced that the merits of service charges as a measure of value of the center are debatable; the need for given technical information is not necessarily accompanied by a commensurate inclination or means to pay directly for it."

"In addition to the eight possibilities mentioned in this survey, the undersigned wishes to propose the creation of a nonprofit making publisher promoter organization to handle the outputs of all IACs. Should such a concept be considered desirable, the undersigned would elaborate on its details."

"Both 4 and 5 are undesirable for a small center unless the center *has* to be funded in this way. If cost-recovery is necessary for inquiry service to be rendered, however, it would be better handled by either 4 or 5 than by 8. The preferred method for a center with a small inquiry volume would by direct funding by agencies and free use by all. Publications, however, should be sold."

"For a small IAC any involvement with cost recovery would probably require an additional person. This might mean a 25 to 100% increase in operating expenses."

"We've spent all of our 8 years of existence creating a climate of goodwill in which the exchanging of this type of information is free – as free as it can be within mostly government-funded programs. We have private industry contributing their efforts, even when the the development was done with private funds – and this in a time when individuals would like to be proprietary and sell their tools."

"The implicit assumptions in proposals for charges are that all clients have access to adequate research support and that all useful research is adequately supported. In contrast, our operating philosophy has been that an information service reaching out to the grant-poor areas of science is one means by which the return on the Government's research investment can be multiplied at relatively little additional cost to the taxpayer. Consequently, a substantial proportion of our clients are active in areas, such as anthropology and zoology, where research fundamental to biomedical research is done but where grant and contract support is scanty. Many of these people would be cut off from service, not because they do not value the service they receive from us or because their work lacks scientific merit, but merely because they are the 'poor' of the scientific community."

"As has been pointed out many times, the compilation, collation and evaluation of such data is as much a part of the overall scientific research effort as is the experimental and theoretical work that resulted in the paper published in the scientific literature. To say that the costs of ope.. ting these data centers should be recovered from the sales of their primary output is equivalent to saying that the costs of running a small university research project or a national laboratory should be recovered from the sales of, e.g., the Physical Review."

"The policy of the Atomic Energy Commission and its contractors has been to ascertain the need for a center, the qualifications of the individuals intending to operate the center; and then, in a burst of wisdom to stay out of their way, support them, and allow them to do the job they are qualified to do."

ANALYSIS AND CONCLUSIONS

One determinant of the varying attitudes of the managers of information centers that had nothing to do with the technical subject areas or the number of users of the center was the number of the staff of the center itself. Where two centers disagreed on the matter of direct charges for inquiries, for example, and there was no other obvious determinant, the larger center would be in favor and the smaller opposed. Some exceptions were small centers (with under 300 users) who favored direct charging or subscriptions, presumably because the bookkeeping load would be acceptable.

In general, the *form* of the center input and output, rather than its subject matter, was controlling. One, which provided photographic copy of satellite earth views, favored direct charges for each inquiry, it being a simple matter to assign a price per unit. A large computerized center, producing selectively disseminated references and bibliographies (as well as surveys) to a captive audience favored subscriptions and direct charges. One center, whose major output is an excellent compilation, irregularly updated, and certainly of wide interest, favored direct charges for each inquiry – but probably gets very few.

Several of the comments quoted above are quite specific concerning the effects of the form and source of input. Where it is based on the voluntary exchange of information, particularly between individuals (rather than installations) and the centers, any interference by the imposition of any kind of charges is felt to be harmful.

The questionnaire itself was not clear as to whether partial or total cost recovery was desired. it is probably for this reason that 5 of the 9 favoring direct charges also equally favored pro-rated or single-source agency funding.